A COMPARATIVE STUDY TO ASSESS THE EFFECTIVENESS OF MYOFASCIAL TRIGGER POINT MANUAL PRESSURE RELEASE WITH CRYOTHERAPY VERSUS ULTRASOUND WITH STRETCHING FOR ACUTE ACHILLES TENDINITIS TO THE SOCCER PLAYERS

Dissertation Submitted to

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Towards the partial fulfillment of the requirement for the degree of

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CHERRAAN'S COLLEGE OF PHYSIOTHERAPY

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COIMBATORE, TAMILNADU, INDIA.

MAY-2019

CERTIFICATE

The work embodied in the thesis entitled **"A COMPARATIVE STUDY TO ASSESS THE EFFECTIVENESS OF MYOFASCIAL TRIGGER POINT MANUAL PRESSURE RELEASE WITH CRYOTHERAPY VERSUS ULTRASOUND WITH STRETCHING FOR ACUTE ACHILLES TENDINITIS TO THE SOCCER PLAYERS"** submitted to THE TAMILNADU DR. M.G.R. MEDICAL UNIVERSITY, CHENNAI-32 in the partial fulfillment for the degree of Master Of Physiotherapy (SPORTS PHYSIOTHERAPY) was carried out by candidate bearing register number of **271750125** at Cherraan's College of Physiotherapy, Coimbatore under my supervision. This is an original work done by him and has not been submitted in part or full for any other degree/diploma at this or any other university/institution. The thesis is fit to be considered for evaluation for award of the degree of Master of Physiotherapy.

……..... .....

Signature of Supervisor Signature of Principal

Mr. A.CHINNACHAMY M.P.T (SPORTS) **Mrs. E.SELVARANI M.P.T (NEURO)**

ASSOCIATE PROFESSOR PRINCIPAL & PROFESSOR

Date: _____ **Date: _____**

Internal Examiner: …….. **External Examiner: ……..**

Project work evaluated on…….

DECLARATION

I hereby declare and present my project work entitled **"A COMPARATIVE STUDY TO ASSESS THE EFFECTIVENESS OF MYOFASCIAL TRIGGER POINT MANUAL PRESSURE RELEASE WITH CRYOTHERAPY VERSUS ULTRASOUND WITH STRETCHING FOR ACUTE ACHILLES TENDINITIS TO THE SOCCER PLAYERS"** The outcome of the original research work undertaken and carried out by me and has not been formed in part or full for anyway the basis for the award of any other degree/diploma at this or any other institute/ university. All the ideas and references have been duty acknowledgement.

…….. ……

Signature of Supervisor Signature of Student

Mr. A. CHINNACHAMY M.P.T (SPORTS)

ASSOCIATE PROFESSOR

Date:

Place:

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ABSTRACT

A COMPARATIVE STUDY TO ASSESS THE EFFECTIVENESS OF MYOFASCIAL TRIGGER POINT MANUAL PRESSURE RELEASE WITH CRYOTHERAPY VERSUS ULTRASOUND WITH STRETCHING FOR ACUTE ACHILLES TENDINITIS TO THE SOCCER PLAYERS

BACKGROUND: Achilles tendinitis is one of the common problems in the soccer players, as they are required to use fine techniques of the game with their feet. Achilles tendon plays major role in outdoor sports activities because of its dual association with the two prime plantar flexors, Gastrocnemius and the Soleus muscles. It most commonly occurs in runners who have suddenly increased the intensity or duration of their runs and who play sports, such as tennis, soccer, basketball etc., and this condition also causes lots of physical and psychosomatic stresses.

METHODOLOGY: A comparative study with pre and post test evaluation of 20 subjects aged 18 to 23 were divided into two groups as experimental therapy (myofascial trigger point manual pressure release with cryotherapy) and conventional therapy (ultrasound therapy with stretching) by using convenient sampling method, samples satisfying inclusion criteria.

RESULT: Results of the present study shows that there is significant difference in pain and foot function following myofascial trigger point manual pressure release therapy with cryotherapy and ultrasound therapy with stretching among Achilles Tendinitis Subjects.

CONCLUSION: The statistical result shows that there is improvement in both the groups. But when comparing both its found that myofascial trigger point manual pressure release technique with cryotherapy is more effective than ultrasound therapy and stretching in reducing pain and improving foot function among Achilles Tendinitis for Soccer Players.

CHAPTER I

INTRODUCTION

Achilles tendinitis is one of the common problems in the soccer players, as they are required to use fine techniques of the game with their feet. Achilles tendon plays major role in outdoor sports activities because of its dual association with the two prime Plantar flexors, Gastrocnemius and the Soleus muscles.

Any injury of the Achilles tendon would probably result in decreased strength of plantar flexors. This affects the plantar flexion of sports person's gait parameters and at large, activities like walking, running and jumping.

The factors, which may result in the inflammation of the Achilles tendon, include the mechanics of running, gait, jumping activities in the field. Furthermore, the type of boot, the playing surface and the biomechanics of foot and ankle of the soccer player also contribute towards the inflammation of the Achilles tendon.

Achilles tendinitis is liable to occur most commonly in rookie soccer players. Soccer players with right foot or generally predisposed to this condition, because the player has to modify the gait pattern in order to compensate a varus or valgus stress of the hind foot. Injuries in soccer players occur due to improper warm up of tissues and also due to improper mechanics of playing skills. The factors cause repeated stress over the tendon and pave way for an acute inflammation to set up there by rendering the player inactive.

Soccer boots that fit poorly would cause friction on both the heel contour and the tendon. Boots with the right heel may not permit adequate range of motion in the mid-foot and the forefoot thus contributing to alternation in foot biomechanics.

Soccer player suffering from Achilles tendinitis typically describes pain as felt along the length of the tendon. This area is tender, particularly while performing active plantar flexion. This condition may result in tightness of Plantaris, Gastrocnemius and Soleus muscle.

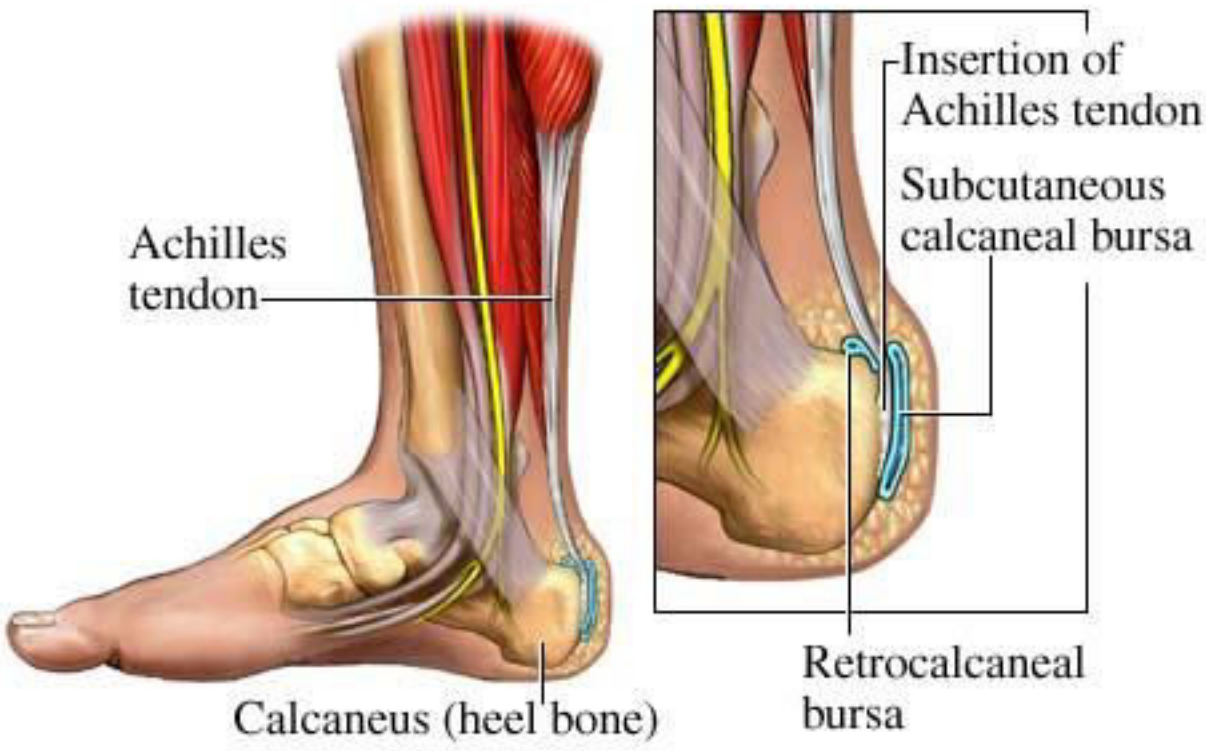


IMAGE-1 SHOWS ACHILLES TENDON

1.1 NEED OF THE STUDY

Achilles tendinitis is a common condition that causes pain along the back of the leg near the heel. It is an overuse injury of the Achilles tendon, the band of tissue that connects calf muscles at the back of the lower leg to the heel bone. It most commonly occurs in runners who have suddenly increased the intensity or duration of their runs and who play sports, such as tennis, soccer, basketball etc., and this condition also causes lots of physical and psychosomatic stresses.

Previous studies states that Myofascial Manual Pressure Release, releases fascia restrictions and restore its tissue elasticity and Ultrasound Therapy more immediate pain relief than traditional modalities alone. But there is lack of studies to compare the effects of Myofascial Manual Pressure Release and Cryotherapy and Ultrasound Therapy and Tendo-Achilles Stretching in treatment of Achilles Tendinitis.

1.2 AIM OF THE STUDY:

A study to find the effectiveness of Myofascial Trigger Point Manual Pressure Release and Cryotherapy with Ultrasound Therapy and Stretching for Achilles Tendinitis of Soccer players.

1.3 OBJECTIVES OF THE STUDY:

- To find out the effect of Myofascial Trigger Point Manual Pressure Release and Cryotherapy in the management of pain and foot function on Achilles Tendinitis for Soccer players.
- To find the effect of Ultrasound Therapy and Tendo-Achilles Stretching in the management of pain and foot function on Achilles Tendinitis for Soccer players.
- To compare the effect of Myofascial Pressure Release on Trigger point and Cryotherapy with Ultrasoound Therapy and Tendo-Achilles Stretching in the management of pain and foot function on Achilles Tendinitis for Soccer players.

1.4 HYPOTHESIS

NULL HYPOTHESIS

There will be no significant reduction in pain and increase in level of function by Myofascial Trigger Point Manual Pressure Release with cryotherapy in Achilles Tendinitis for soccer players.

There will be no significant reduction in pain and increase in level of function by Ultrasound therapy with Tendo-Achilles stretching in Achilles Tendinitis for soccer players.

ALTERNATIVE HYPOTHESIS

There will be significant reduction in pain and increase in level of function by Myofascial Trigger Point Manual Pressure Release with cryotherapy in Achilles Tendinitis for soccer players.

There will be significant reduction in pain and increase in level of function by Ultrasound therapy with Tendo-Achilles stretching in Achilles Tendinitis for soccer players.

1.5 OPERATIONAL DEFINITION:

ACHILLES TENDINITIS

Achilles Tendinitis is usually described as an inflammation (swelling) of the Achilles tendon, although it is actually more correctly described as tiny tears in the tendon caused by overuse.

PAIN

Pain is defined as an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in termed of such damage **(Merskey & Bogduk 1994).**

ULTRASOUND

A form of acoustic vibration propagated in the form of longitudinal compression waves at frequency is too high to heard by human being **(Claytons 2011).**

MYOFASCIAL RELEASE

Myofascial release is a safe and very effective hands on technique that involves applying gentle sustained pressure into the myofascial connective tissue restrictions to eliminate pain and restore motion **(Kwong 2008).**

CRYOTHERAPY

Cryotherapy, sometimes known as cold therapy, is the local or general use of low temperatures in medical therapy. Cryotherapy may be used to treat a variety of tissue lesions. Cryotherapy is used in an effort to relieve muscle pain, sprains and swelling after soft tissue damage or surgery. It can be a range of treatments from the application of ice packs or immersion in ice baths (generally known as cold therapy), to the use of cold chambers**.** (**Raymond Kent Turley**)

STRETCHING

Stretching is a form of physical exercise in which a specific muscle or tendon (or muscle group) is deliberately flexed or stretched in order to improve the muscle's felt elasticity and achieve comfortable muscle tone. The result is a feeling of increased muscle control, flexibility, and range of motion. **(Patria A.; Kolt, Gregory S. 2004)**

FOOT FUNCTION

The foot is an impressive architectural and functional design, able to act as both a flexible supportive base and a rigid lever, it is expected to work efficiently under excessive loads and demands, often in extreme conditions imposed on it by foot wear and the environment in which it had to work .however this complex structure's function depends heavily on having its correct functional angles and joints movements maintained **(Dubin 2007)**

CHAPTER II

REVIEW OF LITERATURE

SECTION A: **STUDIES ON GENERAL ASPECTS OF ACHILLES TENDINITIS**

SECTION B: **STUDIES ON THE EFFECT OF MYOFASCIAL TRIGGER POINT MANUAL PRESSURE RELEASE AND CRYOTHERAPY ON PAIN AND FOOT FUNCTION AMONG ACHILLES TENDINITIS SUBJECTS**

SECTION C: **STUDIES ON THE EFFECT OF ULTRASOUND THERAPY AND STRETCHING ON PAIN AND FOOT FUNCTION AMONG ACHILLES TENDINITIS SUBJECTS**

SECTION D: **STUDIES ON THE RELIABILITY AND VALIDITY OF FOOT FUNCTION INDEX FOR FOOT FUNCTION**

SECTION E: **STUDIES ON THE RELIABILITY AND VALIDITY OF VISUAL ANALOGUE SCALE FOR PAIN**

SECTION A

STUDIES ON GENERAL ASPECTS OF ACHILLES TENDINITIS

KEVIN.B.FREEDON (2004)

Inflammation of the Achilles tendon due to repeated stress exerted over it by altered mechanics adopted by the sports-person. Irritation and swelling of the Achilles tendon is a salient feature of the condition.

EKSTRAND, et al. (7)

Incidence of soccer injuries and their relation to training and team success.

MAHIEU, NN; WITVROUW, E; STEVENS, V; VAN TIGELEN, D; ROGET P

Intrinsic risk factors for the development of Achilles tendon overuse injury: a prospective study. Am. J. Sports Med. 34:Epub ahead of print, 2005.

HANSEN, P; AAGAARD, P; KJAER, M; LARSSON, B; MAGNUSSON, SP:

Effect of habitual running on human Achilles tendon load deformation properties and cross-sectional area. J. Appl. Physiol. 95:2375 – 2380, 2003.

EKSTRAND, J; GILLQUIST, J; MOLLER, M; OBERG, B; LILJEDAHL, SO:

Incidence of soccer injuries and their relation to training and team success. Am. J. Sports Med. 11:63 – 67, 1983.

MCCRORY, ET AL. (26)

Etiologic factors associated with Achilles tendinitis in runner.

SECTION B

STUDIES ON THE EFFECT OF MYOFASCIAL TRIGGER POINT MANUAL PRESSURE RELEASE AND CRYOTHERAPY ON PAIN AND FOOT FUNCTION AMONG ACHILLES TENDINITIS SUBJECTS

DAVID G. SIMONS 2006

This study provides the best evidence informed review of the current scientific understanding of Myofascial trigger points with regard to their aetiology, path physiology, and clinical implications. The clinical aspects of Myofascial trigger points, the interrater reliability for identifying Myofascial trigger points, and several characteristic features are discussed, including the taut band, local twitch response, and referred pain patterns. The aetiology of Myofascial trigger point is discussed with a detailed and comprehensive review of the most 22 common mechanisms, including low-level muscle contractions, uneven intra-muscular pressure distribution, direct trauma, unaccustomed eccentric contractions, eccentric contractions unconditioned muscle, and maximal or sub-maximal concentric contractions. The article explains with a summary of frequently encountered precipitating and perpetuating mechanical, nutritional, metabolic, and psychological factors relevant for physical therapy practice.

SIMMONDS, MILLER, & GEMMELL, 2012; TOZZI, 2012

There are various manual therapies (eg Rolfing, myofascial release, muscle energy, soft-tissue and massage) which aim to alter scar tissue formation, break adhesions points or increase gliding within fascially restricted regions.

BARNES 1997

Describes how manual therapy can affect fascia by altering its viscoelastic, shock and energy absorbing properties by changing the ground substance, these changes may be associated with altering the ground substance from a dense to more fluid state.

SCHLEIP 2003

Discusses fascial innervation by mechanoreceptors and the implications manual therapy may have on motor units through stimulating these receptors.

CHAUDHRY et al. 2008

Investigated the relationship between mechanical forces and fascial deformation produced during manual therapy techniques by developing a three-dimensional mathematical model. The model was developed with the intention of determining the amount of force required to alter connective tissue properties. **Chaudhry et al. (2008)** report that for dense fascia such as the fascia latae and plantar fascia, the forces used in manual therapy are insufficient to alter these tissues. It has been proposed that neurophysiological effects also play a large role in producing the benefits observed following manual therapy (**Simmonds et al., 2012**).

BORGINI, STECCO, DAY AND STECCO 2010

Investigated the amount of time required to modify a fascially restricted region and decrease pain in patient with low back pain using a 'Fascial Manipulation' technique. Results demonstrated in chronic pain subjects the mean ±SD time required to halve pain was 3.29 ±1.3 min, while in subacute patients the mean ±SD time was 2.20 ±1.1 min. Borgini et al (2010) hypothesize that increasing sliding in the fascial layers generates an increase in temperature that is able to alter the ground substance, and increase the fluidity of the extracellular matrix, thus allowing the nerve endings in the fascia to adapt to the pressure introduced in manual therapy and reduce the perceived pain in that region.

MARTÍNEZ RODRÍGUEZ AND GALÁN DEL RÍO 2013

Developed a scar modelling technique that involves combined use of torsion, shear, traction, axial and compression vectors on scar tissue to normalize fascial restriction. Currently, further investigations are required to investigate the mechanisms and efficacy of this technique, the use of elastography in conjunction with this technique has been proposed to assess and monitor the technique's effectiveness.

MARTÍNEZ RODRÍGUEZ & GALÁN DEL RÍO, 2013

Additionally, hyalonuric acid has recently attracted interest for its role in facilitating sliding. A recent study investigated the relationship between manual therapy motions (constant sliding, tangential oscillation, perpendicular vibration) and hyaluronic acid flow within the fascial layers. Results indicated manual therapy is able to increase levels of hyaluronic acid in the fascial layers, this can improve gliding and encourage efficient muscle function.

WOLFE, F., SIMONS, D., FRICTON, J., BENNETT, R.M., GOLDENBERG, D.L., GERWIN, R., HATHAWAY, D., MCCAIN, G.A., RUSSELL, I.J., SANDERS, H.O., SKOOTSKY, S.A., 1992

The fibromyalgia and myofascial pain syndromes: a preliminary study of tender points and trigger points in persons with fibromyalgia, myofascial pain syndrome.

SIMONS, D., HONG, C., SIMONS, L., 1995

Prevalence of spontaneous electrical activity at trigger spots and at control sites in rabbit skeletal muscle. Journal of Musculoskeletal Pain 3, 35–48.

KERSCHAN-SCHINDL K1, UHER EM, ZAUNER-DUNGL A, FIALKA-MOSER V. 1998

Cryotherapy increases the threshold of pain and induces physiological changes. It influences hemodynamic (reduction of skin- and muscle temperature through vasoconstriction), metabolism (reduction of ischemia due to hypoxia), and neural control (reduction of nerve conduction velocity and muscle tone). Cryotherapy is indicated mainly in locomotors system related pain. Such pain can be induced by degenerative changes, postoperatively, and during mobilization of contracted joints. Cryotherapy may be used as short term therapy (less than 15 min) as well as long term therapy (more than 20 min). For maximal efficacy the intensity of application as well as the application medium must be considered. Due to biorhythm, cold application seems to be more effective in the afternoon.

ERNST E1, FIALKA V. 1994

Among the physical treatments to reduce pain, ice has had its place for many years. Experience tells us that ice has a strong short-term analgesic effect in many painful conditions, particularly those related to the musculoskeletal system. Serial applications may also be helpful. The scientific evidence from clinical trials is, however, fragmentary. This applies both for acute and serial cold-induced analgesia. The mechanisms by which cryotherapy might elevate pain threshold include an antinociceptive effect on the gate control system, a decrease in nerve conduction, reduction in muscle spasm, and prevention of edema after injury. It is concluded that ice may be useful for a variety of musculoskeletal pains, yet the evidence for its efficacy should be established more convincingly.

SECTION C

STUDIES ON THE EFFECT OF ULTRASOUND THERAPY AND STRETCHING ON PAIN AND FOOT FUNCTION AMONG ACHILLES TENDINITIS SUBJECTS

ABRAMSON ET AL 1960

Observed changes in blood flow, O_2 uptake and tissue temperature produced by application of ultrasound.

LEHMANN IF AND GUY AW 1972

Stated that soft tissue repair might be accelerated by both thermal and non-thermal effects of ultrasound.

SANDLER 1982

Proposed that when ultrasound applied through pulsed method it would produce biophysical effect.

LOW J, READ A 1990

Stated that with pulsed ultrasound a less localized warming of the tissue may occur that can lead to an increase in the sensitivity of ligaments, tendons and scar tissue. These effects may contribute to the reported analgesic action of pulse ultrasound and may reduce the muscle spasm.

HOLMES MAM 1996

Stated that pulsed ultrasound is an electro therapeutic modality that has been used typically to decrease the symptoms of inflammation (pain and edema) and to increase the rate of healing in many conditions.

ANGELA FORSTER, NIGEL PALASTANGA 1996

Claytons Electrotherapy - local rise in temperature due to ultrasound accelerates healing as well as help to reduce pain.

JOSEPH MC. COLLOCK 1997

Stated that ultrasound effects fibroblasts and stimulate than to secrete collagen, which accelerates the process of wound contraction and increase tensile strength of healing tissue.

LISTO J.M. 1997

Stated that ultrasound is mainly useful in reducing pain, edema and to improve strength.

ROBERT VJ, BAKER KG 1998

Stated that active therapeutic ultrasound is more effective for treating people with musculoskeletal injuries and for promoting soft tissue healing.

ANGELA FOVSTER, NIGEL PALASTANGA 1998

Claytons Electrotherapy- ultrasound increase the fragility of Lysosomal membranes and their contained enzymes, these will help to clear the area of debris and allow next stage of inflammation to occur.[1]

MICHELLE H. CAMERON 2001

Ultrasound applied in a pulse mode at low intensity during the acute phase of inflammation accelerates recovery.

BAKER KG 2001

Stated that the ultrasound modality is used for pain control and promotion of soft tissue healing to increase extensibility of soft tissue.

PARK DY, CHOU L. 2006

Professional and recreational athletes commonly perform pre-exercise stretching to prevent musculoskeletal injuries. Little definitive evidence exists that clearly demonstrates the efficacy of stretching in reducing injury. Achilles tendon injuries are among the most common injuries affecting active individuals in the United States today. Clinicians commonly recommend stretching the Achilles tendon without concrete scientific evidence to support such a claim. Few studies have addressed the effect of stretching in Achilles tendon injuries, and it is unclear if the conclusions made for musculoskeletal injuries can be applied

to the Achilles tendon. Biomechanical studies of the Achilles tendon and measurements of the tendon's reflex activity have demonstrated possible mechanisms for the potential benefit of stretching, including load-induced hypertrophy and increased tendon tensile strength. Recent prospective studies have contended that reductions in plantar flexor strength and increases in ankle dorsi-flexion range of motion from stretching the Achilles tendon may increase the risk of injury. Studies examining stretching in injury prevention, the biomechanical properties of injuries to the Achilles tendon were compiled and reviewed. Although many theories have been published regarding the potential benefits and limitations of stretching, few studies have been able to definitively demonstrate its utility in injury prevention.

THACKER, SB; GILCHRIST, J; STROUP, DF; KIMSEY, CD JR

The impact of stretching on sports injury risk: a systematic review of the literature. Med Sci Sports Exerc. 36:371 – 8, 2004.

KUBO, K; KANEHISA, H; KAWAKAMI, Y; FUKUNAGA, T

Influence of static stretching on viscoelastic properties of human tendon structures in vivo. J Appl Physiol. 90:520 – 527, 2001.

MAGANARIS, CN

Force-length characteristics of the in vivo human gastrocnemius muscle. Clin Anat. 16:215 – 223, 2003.

SECTION D

STUDIES ON THE RELIABILITY OF FOOT FUNCTION INDEX FOR FOOT FUNCTION

ENDNOJ ET AL., 2009

Conducted a study to examine the test –retest reliability, internal consistency, construct and criterion validity of Foot Function Index. He found that the test –retest reliability of the foot function index total and sub – scale scores ranged from 0.87 to 0.69. The internal consistency ranged from 0.96 to 0.73 and the strong correlation between foot function index and subscale scores and clinical measures of foot pathology supported the criterion validity of the index, therefore concluded that Foot Function Index was useful for both clinical and research purpose.

WU SH ET AL., 2008

Conducted a study to test the reliability and validity of the Taiwan Chinese version of the foot function index (FFI) among patients with plantar fascitis and ankle /foot fracture where fifty achilles tendinitis patients and 29 ankle/foot fracture patients volunteered for the cross sectional survey and 24 were retested later and pain subscale and the activity limitation subscale were used and they concluded that the adapted Taiwan Chinese version of the FFI was reliable and valid and can be applied among traumatic and non traumatic foot disorders**.**

AGEL ET AL., 2005

Performed a study on reliability of the Foot Function Index A report of the AOFAS outcomes Committee and the results concluded that The FFI appeared to be a reasonable tool for low functioning individuals with foot disorders.

MAK ET AL., 2003

In a study The Foot Index : a measure of foot pain and disability concluded that test.,-retest reliability of the FFI total and sub –scale scores ranged from 0.87 to 0.69. Internal consistency ranged from 0.96 to 0.73with the exception of two items; factor analysis supported the construct validity of the total index and the sub-scales. Strong correlation between the FFI total and sub-scale scores and clinical measures of foot pathology supported.

SETO ET AL., 2000

In a study explained that FFI was done to examine the following measurement properties of the foot and Ankle disability Index (FFDI) and the FFDI Sport: intersession reliability during 1 and 6 week intervals .Sensitivity to differences between healthy subjects and subjects with chronic Ankle instability (CAI) and sensitivity to changes in those with CAI after rehabilitation. Fifty recreationally active subjects were taken. They took FADI and FADI sport as outcome methods .The result was infraclass correlation coefficients, for the FADI and FADI sport at 1 week were 0.89 and 0.84, respectively, for the involved limbs .Over 6 weeks, the ICC. Values for the involved limb of subjects who did not complete rehabilitation were 0.93 and 0.92, respectively for both surveys, Scores were significantly less for the involved limbs of subjects with CAI compared with their uninvolved limbs. No significant side to side differences were noted among the healthy subjects. Scores on both surveys increased significantly after rehabilitation. They concluded that the FADI and FADI sport appeared to be reliable in detecting functional limitations in subjects with CAI, sensitive to difference between healthy subjects and subjects with CAI and responsive to improvement in function after rehabilitation in subjects with CAI.

SECTION E

STUDIES ON THE RELIABILITY OF VISUAL ANALOGUE SCALE FOR PAIN

BEIJING ET AL., 2008

Concluded VAS as a reliable and valid instrument to assess pain intensity and selected the VAS as an outcome measure to detect immediate changes in pain.

BIJUR ET AL., 2005

In a study reliability of the visual analogue scale for measurement of acute pain suggested that reliability of the VAS for acute pain measurement as assessed by the ICC appeared to be high. Ninety percent of the pain ratings were reproducible within 9 mm. These data suggested that the VAS is sufficiency reliable to be used to assess acute pain.

CARLSSON 2004

Did a study to evaluate the reliability and validity of the visual analogue scale in case of chronic pain. The visual analogue scale (VAS) was a simple and frequently used method for the assessment of variations in intensity of pain. In clinical practice the percentage of pain relief, assessed by VAS, is often considered as a measure of the efficacy of treatment. Two types of VAS, an absolute and a comparative scale, were compared with respect to factors influencing the reliability and validity of pain estimates. As shown in that study the absolute type of VAS seemed to be less sensitive to bias than the comparative one was therefore preferable for general clinical use.

SETO ET AL., 1997

Explained in a study that VAS provided a simple technique for measuring subjective experience. VAS had been established as valid and reliable tool in a range of clinical research applications. Although there was also evidence of increased error and decreased sensitivity when using with some subject groups. Decisions concerned with the choice of scoring interval, experimental design, and statistical analysis for VAS had been in some instances bases on convention, assumption and convenience, highlighting the need for more comprehensive assessment of individual scales if that versatile and sensitive measurement techniques were to be used to full advantage.

CHAPTER III

MATERIALS AND METHODOLOGY

3.1 METHODOLOGY

3.1.1 STUDY DESIGN:

This Study was Comparative Study Design.

3.1.2 STUDY SETTING:

The study was conducted in the outpatient department of Cherran's College of physiotherapy, Coimbatore.

3.1.3 STUDY DURATION:

The study was conducted for two weeks.

3.1.4 SAMPLING METHOD:

The Subject were selected by using convenient Sampling method.

3.1.5 SELECTION OF SUBJECTS:

Soccer players with Acute Achilles tendinitis of age group 18 to 23 years were taken as subjects for study. The samples were equally divided into two groups as Group A Conventional Therapy and Group B Experimental Therapy. Each group has 10 samples.

- **GROUP A** - Ultrasound therapy with Stretching
- **GROUP B** - Myofascial Trigger Point Manual Pressure Release with Cryotherapy

3.1.6 ORIENTATION TO THE SUBJECTS:

Before collection of data, alls the subjects were explained about the purpose of the study. The investigator had given a detail orientation to the various test procedures such as VAS for pain and FFI for foot function. The concern and full cooperation of each participant was sought after complete explanation of the condition and demonstration of the procedure involved in the study.

3.2 CRITERIA FOR SELECTION

3.2.1 INCLUSION CRITERIA:

- Soccer player with Acute Achilles tendinitis.
- Subjects should be actively participating in the study.
- Age ranging from 18-23 years
- Gender: Male

3.2.2 EXCLUSION CRITERIA:

- Subjects with condition other than Acute Achilles tendinitis.
- Age below and above 18 - 23 years.
- Subjects other than soccer players.
- Subjects not willing to participate in study.

3.2.3 MATERIALS USED:

- Couch and chair
- Towel roll
- Pillows
- Gloves
- Cotton
- Scissor
- Ultrasound
- Ice gel Pack
- Goniometry
- Lubricant
- Assessment chart
- Gauze
- Sterile hand rub

MATERIALS USED:

3.3 VARIABLES:

INDEPENDENT VARIABLE:

- Myofascial Trigger point Manual Pressure Release
- Ultrasound
- Cryotherapy
- Stretching

DEPENDENT VARIABLE:

- Pain
- Foot function

3.4 MEASUREMENT TOOLS:

VARIABLE	TOOL
Pain	Visual analogue scale
Foot function	Foot function index

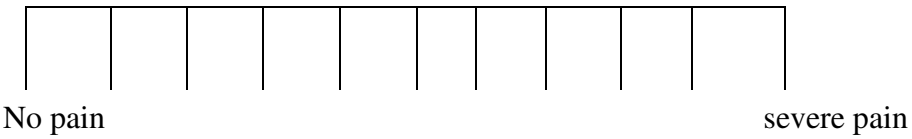
3.5 TEST ADMINISTRATION:

FOOT FUNCTION INDEX:

This questionnaire was designed to give information to the therapist to find out how foot pain has affected the ability of the patient to manage in everyday life. The patients were asked to answer every question. For each of the questions, score was given based on a scale from 0 (no pain or difficulty) to 10 (worst pain imaginable or so difficult that required help) that best described patients foot over the past week.

VISUAL ANALOG SCALE:

Visual analog scale consists of 10cm horizontal line with 2 end points labeled respectively. One end is labeled as no pain and other is labeled as severe pain. The subjects were asked to place mark on the 10cm line at a point which corresponded to their level of pain intensity.



3.6 TREATMENT PROCEDURE:

A brief explanation of the study was given to prepare the subjects after obtaining the informed consent 20 subjects were selected for this study, based on the inclusion and exclusion criteria.

They were divided into 2 groups, Group A and Group B

- **GROUP A** - Ultrasound Therapy With Stretching
- **GROUP B** - Myofascial Trigger Point Manual Pressure Release.

GROUP A

ULTRASOUND THERAPY AND STRETCHING:

A sample of 10 subjects was selected according to the convenience from the population of the study.

STEP 1:

A pre-test measurement of pain and range of motion were taken using numerical pain rating scale and a goniometry respectively.

STEP 2:

The patient was positioned in comfortable prone lying with pillow supporting the anterior aspect of ankle. Ultrasound was given to the patient with a frequency of 1-1.5MHZ in pulsed mode of 1.8-watts/ sq.cm, duration of 8 minutes.

STEP 3:

A pre-test measurement of pain and range of motion were taken.

STEP 4:

Appropriate Stretching for the above muscles and fascia was taught and made to do 3 stretches using a 20 second hold , 20 second recovery time and will be repeated 3 times, twice a day.

STEP 5:

The post-test measurement of pain and range of motion were taken.

STEP 6:

Treatment with Ultrasound modality with stretching lasted over two weeks duration

ULTRASOUND APPLICATION FOR ACHILLES TENDINITIS

GROUP B

MYOFASCIAL TRIGGER POINT MANUAL PRESSURE RELEASE AND CRYOTHERAPY:

A sample of 10 subjects was selected according to the convenience from the population for the study.

STEP 1:

A pre-test measurement of pain and range of motion were taken using numerical pain rating scale and goniometry respectively.

POSITION:

The patient was positioned in comfortable prone lying position with ankle plantar-flexed to 20 degrees and held neutral, that is, neither inverted nor everted. The affected part elevated (foot elevated by using pillow) then the pain was measured using numeric pain rating scale and a range of motion was taken by using Goniometry.

STEP 2:

Manual trigger release technique will be given in group B along with cryotherapy. The subject was laid on a couch and the affected side leg was kept extended on the couch in a comfortable positioning according to the muscle.

The therapist will stand or sit on the affected side of the subject's leg and treated with his thumb or elbow on the necessary muscles like the Soleus, Gastrocnemius and Plantaris with the required pressure.

DURATION: 20minutes

Each muscle six minutes in anticlockwise manner.

STEP 3:

A pre-test measurement of pain and range of motion were taken.

STEP 4:

The patient was positioned in a comfortable lying, with the affected part elevated (foot elevated by using pillow). The pain was measured using numeric pain rating scale and range of motion was taken by using goniometry. Treatment was initiated by causing numbness over the posterior ankle joint with ice pack massage. The initial numbness takes anywhere from 10-20 minutes to set in during initial cold applications.

STEP 5:

The post-test measurement of pain and range of motion were taken.

STEP 6:

Treatment with Myofascial Trigger Point Manual Pressure Release and Cryotherapy lasted over two weeks duration.

MYOFASCIAL TRIGGER POINT RELEASE FOR ACHILLES TENDINITIS

CRYOTHERAPY APPLICATION FOR ACHILLES TENDINITIS

3.7 COLLECTION OF DATA:

THE SELECTED SUBJECTS WERE DIVIDED INTO 2 GROUPS:

- **Group A** - Ultrasound Therapy With Stretching.
- **Group B** - Myofascial Trigger Point Manual Pressure Release With Cryotherapy.

Both the experimental groups were given treatment for continuous 2 weeks. Before and after the completion of 2 weeks treatment intervention, pain and foot functions were evaluated by VAS and FFI respectively and recorded.

STATISTICAL TECHNIQUE:

The collected data were analyzed by paired 't' test to find out significance difference between pre and post -test values of experimental groups and further unpaired 't' test was applied to find out the differences between groups.

CHAPTER IV

DATA ANALYSIS AND RESULTS

4.1 DATA ANALYSIS

This chapter deals with the systematic presentation of the analyzed data followed by the interpretation of the data.

(a) Paired 't' test

$$\bar{d} = \frac{\sum d}{n}$$

$$s = \frac{\sqrt{\sum d^2 - \frac{\sum (d)^2}{n}}}{n-1}$$

$$t = \frac{\bar{d}\sqrt{n}}{s}$$

Where,

d – Difference between pre test and post test values

$\bar{d} = \frac{\sum d}{n}$ – Mean of difference between pre test and post test values

n – Total number of subjects

s – Standard deviation

(b) Un Paired 't' test

$$s = \sqrt{\frac{\sum (x_1 - \bar{x}_2)^2 + \sum (x_2 - \bar{x}_2)^2}{n_1 + n_2 - 2}}$$

$$T = \frac{\bar{x}_1 - \bar{x}_2}{s} \sqrt{\frac{n_1 n_2}{n_1 + n_2}}$$

Where,

S = Standard deviation

n_1 = Number of subjects in Group A

n_2= Number of subjects in Group B

$\bar{x}_1$ = Mean of the difference in values between pre-test and post-test in Group-A

$\bar{x}_2$= Mean of the difference in values between pre-test and post-test in Group-B

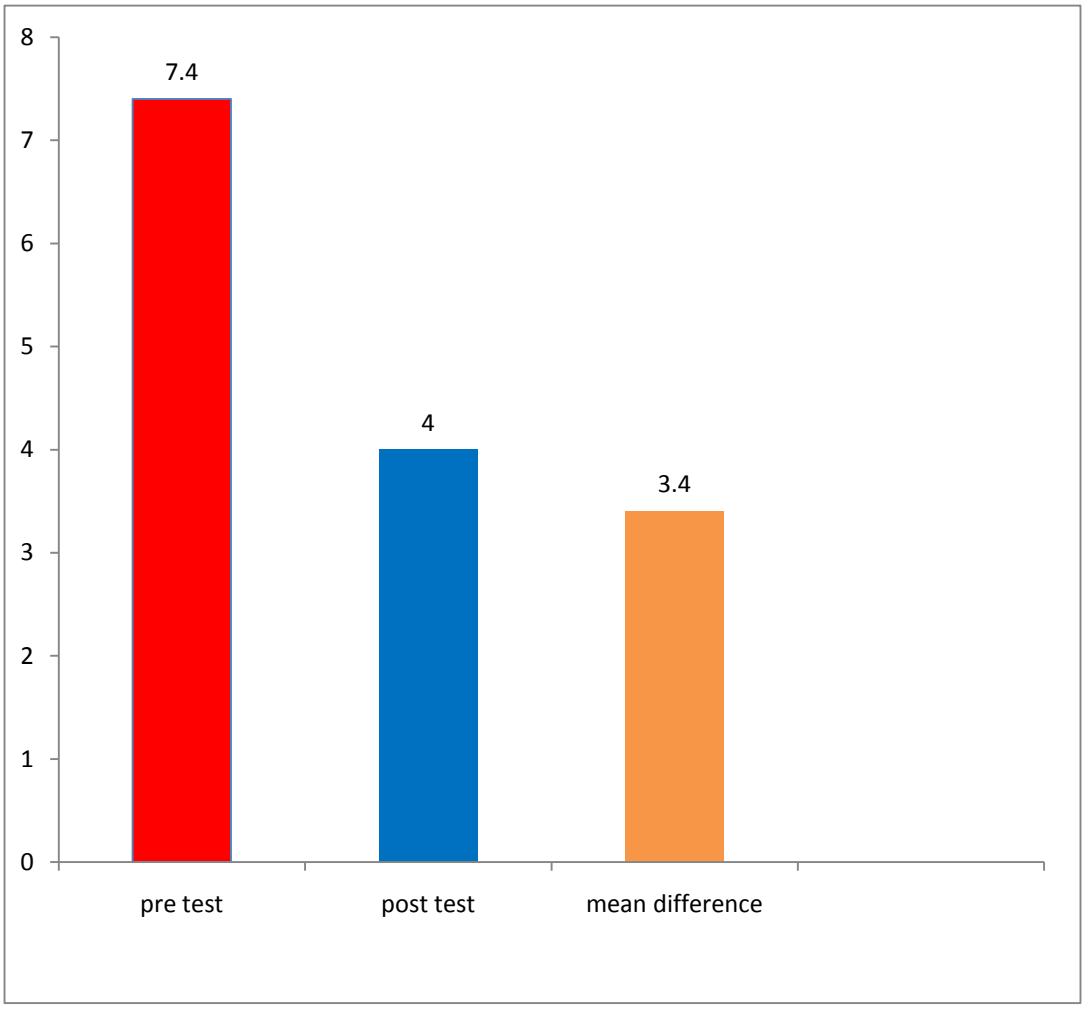
TABLE-1

THE MEAN VALUE, MEAN DIFFERENCE, STANDARD DEVIATION AND PAIRED 'T' VALUE BETWEEN PRE AND POST TEST SCORES OF PAIN AMONG GROUP A

Measurement	Mean	Mean difference	Standard deviation	Paired 't' value
Pre- test	7.4	3.4	1.1832	8.8*
Post- test	4			

*0.005 level of significance

In Group A calculated paired't' value for pain is 8.8 and the 't' table value is 3.250 at 0.005 level of significance .Since the calculated 't' value is more than the 't' table value above value shows that there is significant difference in pain following ultrasound therapy in Achilles Tendinitis subjects.



GRAPHICAL REPRESENTATION OF PRE AND POST-TEST MEAN VALUES OF PAIN FOR GROUP A SUBJECT

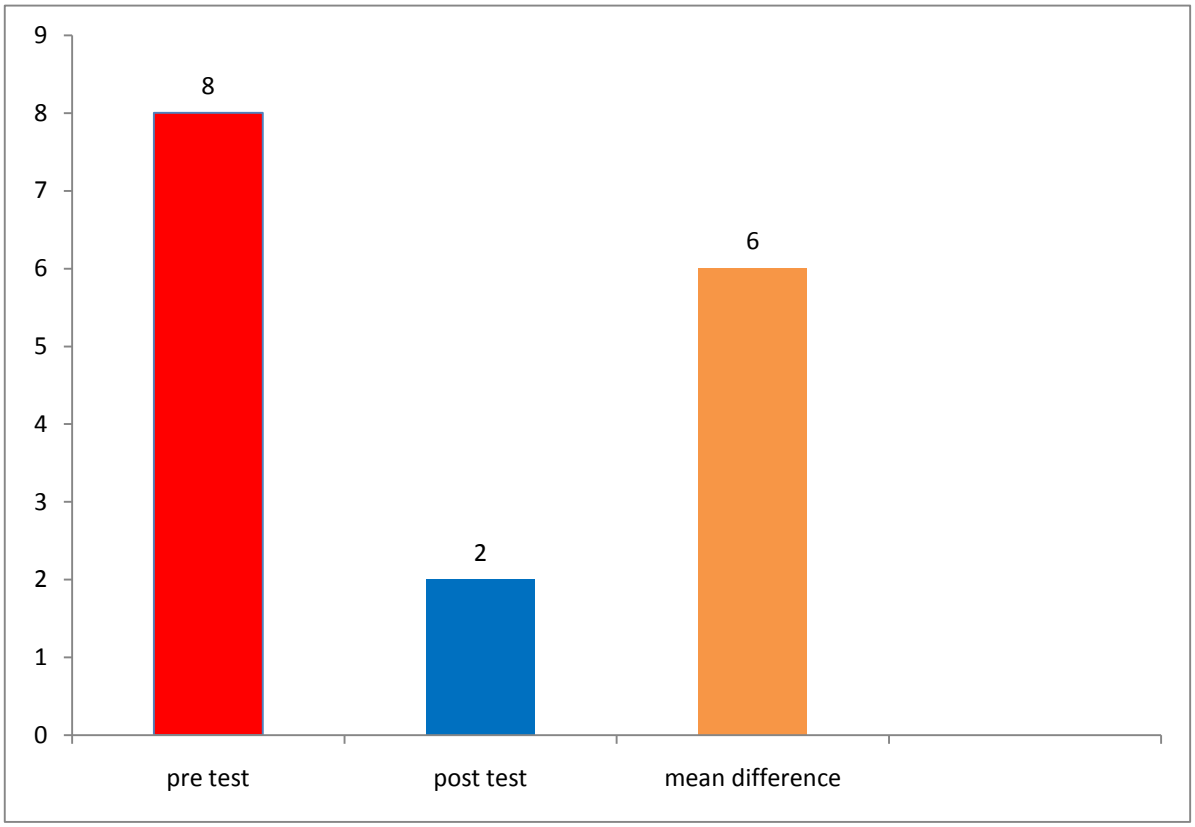
TABLE-2

THE MEAN VALUE, MEAN DIFFERENCE, STANDARD DEVIATION AND PAIRED 'T' VALUE BETWEEN PRE AND POST TEST SCORES OF PAIN AMONG GROUP B

Measurement	Mean	Mean difference	Standard deviation	Paired 't' value
Pre- test	8	6	3.898	4.86*
Post- test	2			

*0.005 level of significance

In Group B calculated paired't' value for pain is 4.86 and the 't' table value is 3.250 at 0.005 level .Since the calculated 't' value is more than the 't' table value, the above value shows that there is significant difference in pain following myofascial trigger point manual pressure release in Achilles tendinitis subjects.



GRAPHICAL REPRESENTATION OF PRE AND POST-TEST MEAN VALUES OF PAIN FOR GROUP B SUBJECTS

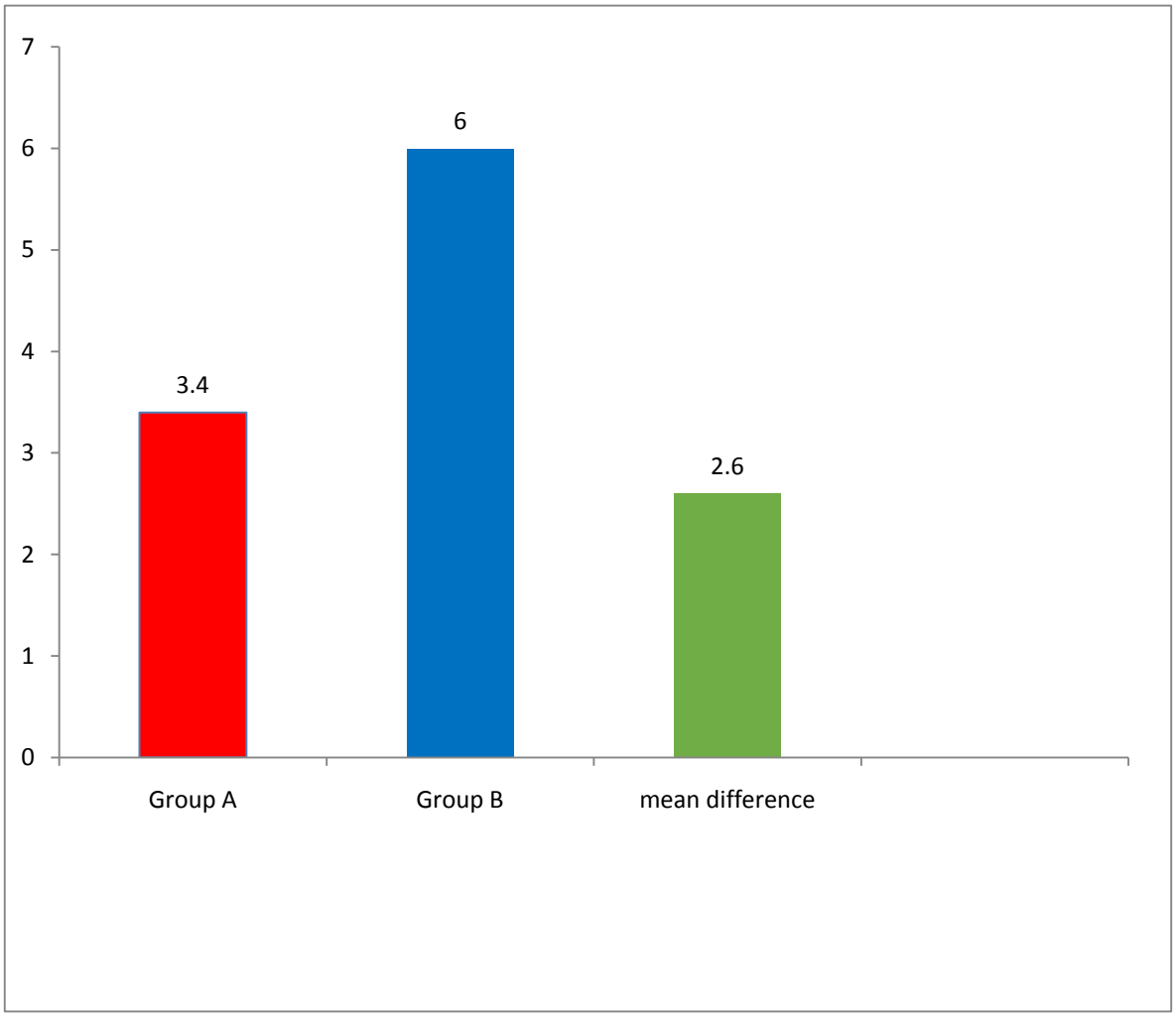
TABLE-3

THE MEAN VALUE, MEAN DIFFERENCE, STANDARD DEVIATION, AND UNPAIRED 'T' VALUE OF PAIN BETWEEN GROUP A AND GROUP B

Sl.no	Groups	Improvement		Standard deviation	Un paired 't' Test
		Mean	Mean Difference		
1	GROUP-A	3.4	2.6	7	5.4*
2	GROUP-B	6			

*0.005 level of significance

In Group A and B (for pain) calculated un paired 't' value is 5.4 and the 't' table value is 2.87 at 0.005 level since the calculated 't' value is more than the 't' table value above value shows that there is significant difference between ultrasound and myofascial trigger point manual pressure release in pain among achilles tendinitis subjects.



GRAPHICAL REPRESENTATION OF PRE AND POST-TEST MEAN VALUES OF PAIN IN GROUP A AND GROUP B

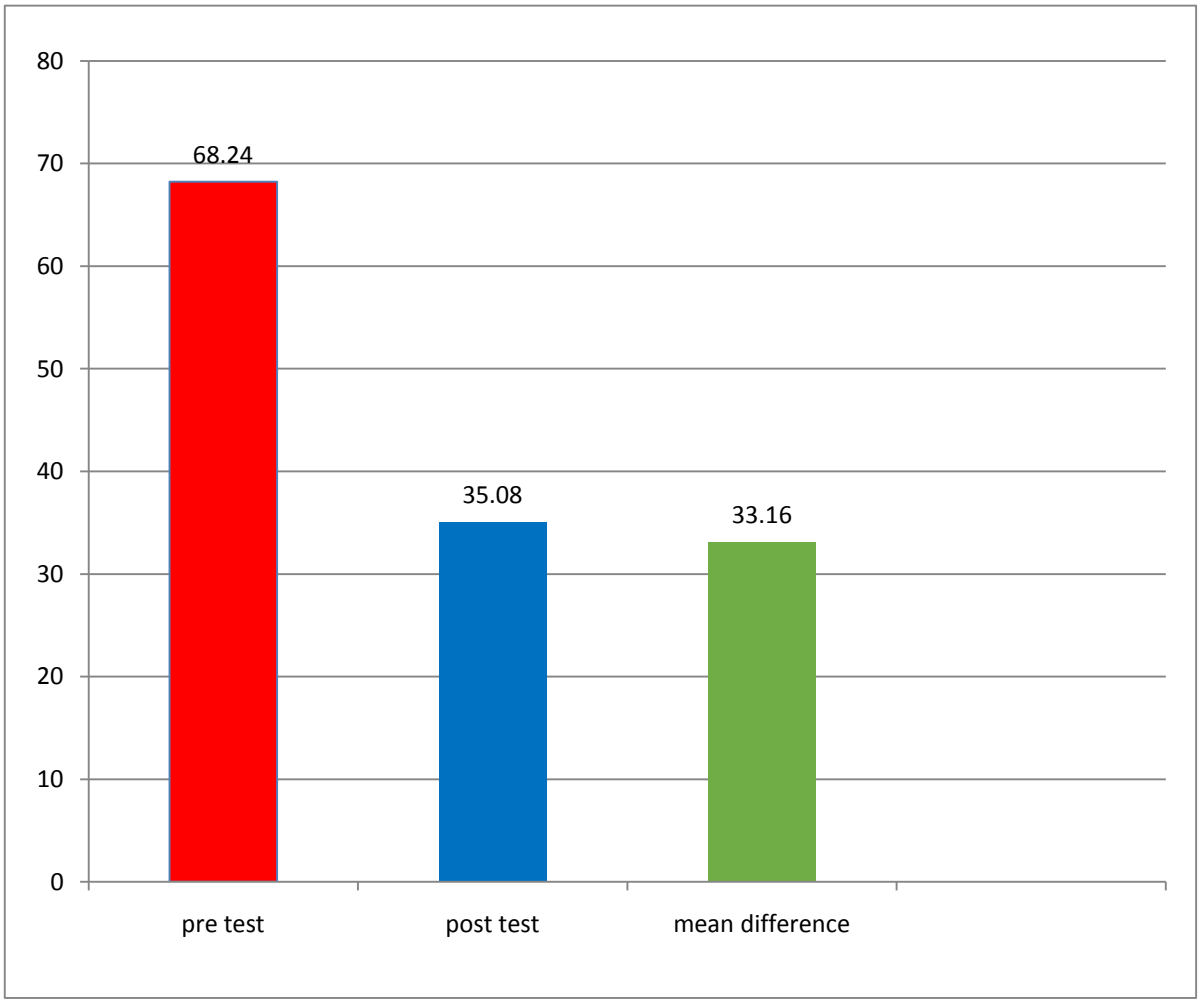
TABLE- 4

THE MEAN VALUE, MEAN DIFFERENCE, STANDARD DEVIATION, AND PAIRED 'T' VALUE BETWEEN PRE- TEST AND POST-TEST SCORES OF FOOT FUNCTION ABILITY AMONG GROUP A

Measurement	Mean	Mean difference	Standard deviation	Paired 't' value
Pre- test	68.24	33.16	33.11	3.163*
Post- test	35.08			

*0.005 level of significance

In Group A for FFI calculated un paired 't' value is 3.163 and 't' table value is 2.87 at 0.005 level .Since the calculated 't' value is more than 't' table value above value shows that there is significant difference in foot function following ultrasound therapy in achilles tendinitis subjects.



GRAPHICAL REPRESENTATION OF PRE AND POST-TEST MEAN VALUES OF FFI AMONG GROUP A

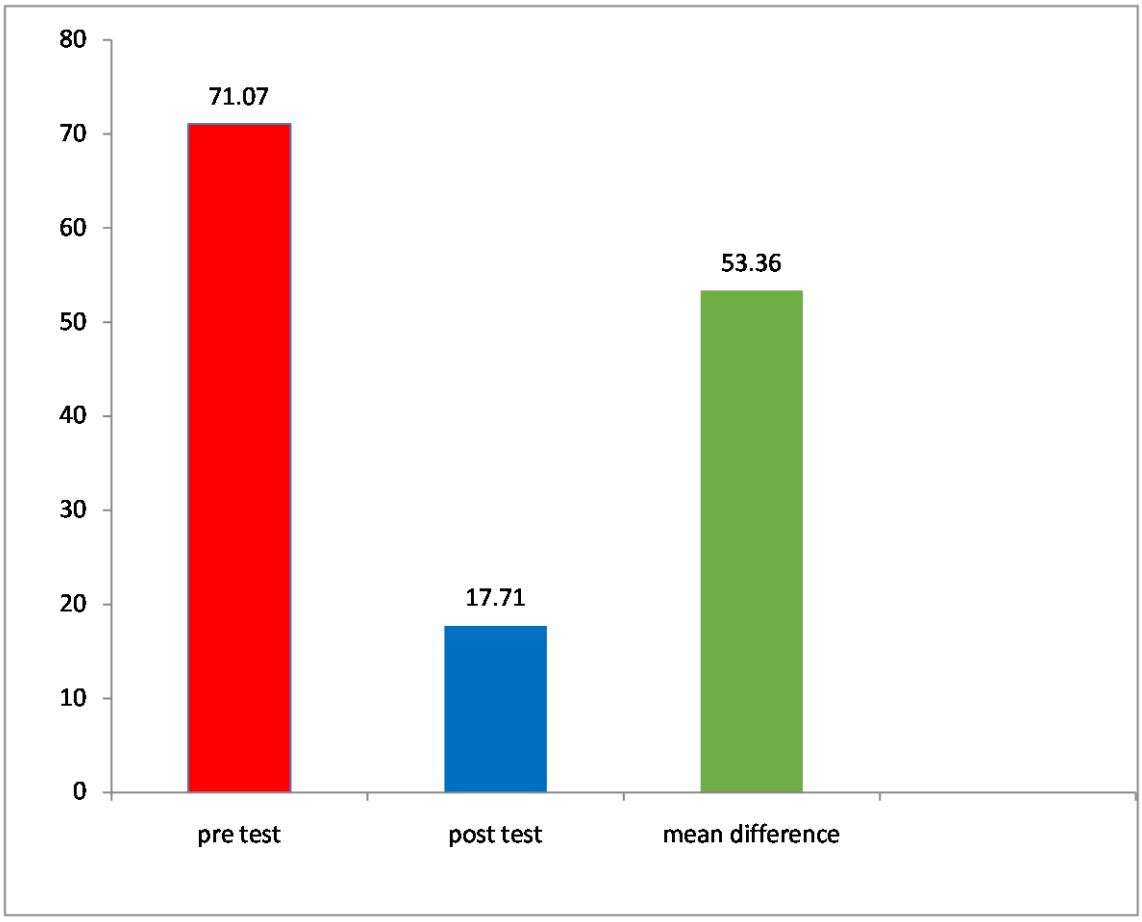
TABLE- 5

THE MEAN VALUE, MEAN DIFFERENCE, STANDARD DEVIATION, AND PAIRED 'T' VALUE BETWEEN PRE- TEST AND POST-TEST SCORES OF FOOT FUNCTIONAL ABILITY AMONG GROUP B

Measurement	Mean	Mean difference	Standard deviation	Paired 't' value
Pre- test	71.07	53.36	53.63	3.14
Post- test	17.71			

*0.005 level of significance

In Group B for FFI calculated paired 't' table value is 3.14 and 't' table value is 2.87 at 0.005 level .Since the calculated 't' value is more than the 't' table value above value shows that there is significant difference in foot function following myofascial trigger point manual pressure release in achilles tendinitis subjects.



GRAPHICAL REPRESENTATION OF PRE AND POST-TEST MEAN VALUES OF FFI GROUP B

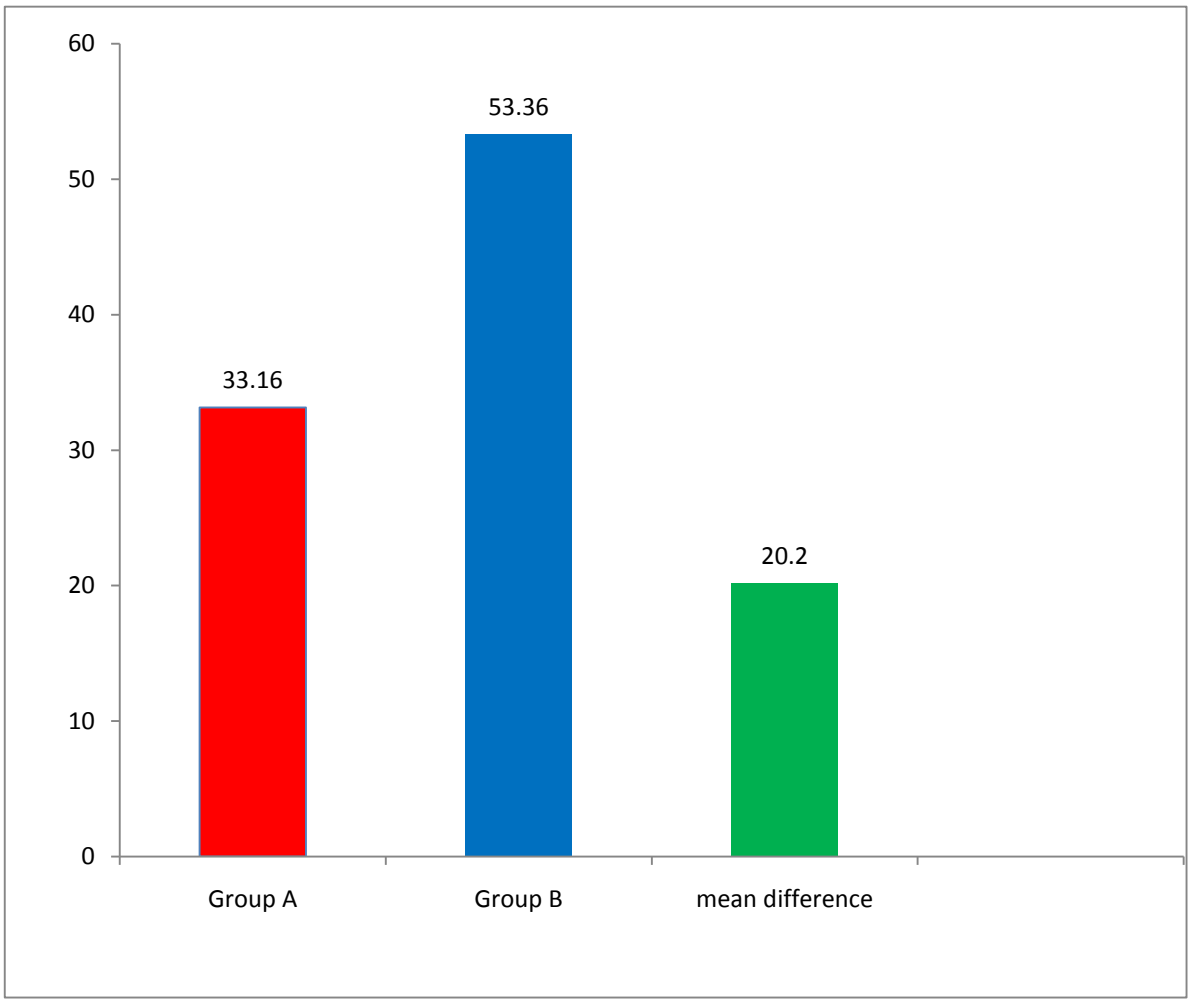
TABLE-6

THE MEAN VALUE, MEAN DIFFERENCE, STANDARD DEVIATION AND UNPAIRED 'T' VALUE OF FOOT FUNCTIONAL ABILITY BETWEEN GROUP A AND GROUP B

Sl.no	Groups	Improvement		Standard deviation	Un paired 't' Test
		Mean	Mean Difference		
1	GROUP-A	33.16	20.2	1.24	36.30*
2	GROUP-B	53.36			

*0.005 level of significance

In Group A and B for FFI calculated un paired't' value is 36.30 and the't' table value is 2.87 at 0.005 level .Since the calculated't' value is more than the't' table value above value shows that there is significant difference between ultrasound therapy and myofascial trigger point manual pressure release in the management of foot function among achilles tendinitis subjects.



GRAPHICAL REPRESENTATION OF PRE AND POST-TEST MEAN VALUES OF FFI GROUP A AND GROUP B

4.2. RESULTS

20 soccer players with achilles tendinitis were selected for the study. The subjects were randomly divided into two groups.

Group A subjects were treated with ultrasound therapy and stretching.

Group B subjects were treated with myofascial trigger point manual pressure release and cryotherapy.

ANALYSIS OF DEPENDENT VARIABLE PAIN IN GROUP A:

The calculated Paired‘t’ value is 8.8 and the table‘t’ value is 3.25 at 0.005 level of significance. Hence, the calculated‘t’ value is greater than the Table‘t’ value. There is significant difference in pain following ultrasound therapy with stretching among achilles tendinitis subjects.

ANALYSIS OF DEPENDENT VARIABLE PAIN IN GROUP B:

The calculated paired‘t’ value is 4.86 and the table‘t’ value is 3.25 at 0.005 level of significance. Hence, the calculated‘t’ value is greater than the table ‘t’ value there is significant difference in pain following myofascial trigger point manual pressure release technique with cryotherapy.

DEPENDENT VARIABLE PAIN BETWEEN GROUP A AND GROUP B:

The calculated unpaired’t’ value is 5.44 and the table‘t’ value is 3.250 at 0.005 level of significance. Hence, the calculated‘t’ value is greater than table ‘t’ value there is significant difference between conventional therapy and myofascial trigger point manual pressure release techniques in reducing achilles tendinitis in soccer players .

When comparing the mean values of Group A and Group B, Group B subjects treated with myofascial trigger point manual pressure release and cryotherapy showed more difference than Group A. Hence it is concluded that myofascial release therapy with cryotherapy is more effective than ultrasound therapy with stretching in reducing pain among achilles tendinitis in soccer players.

ANALYSIS OF DEPENDENT VARIABLE FOOT FUNCTION IN GROUP A:

The calculated paired‘t’ value is 3.163 and the table‘t’ value is 3.250 at 0.005 level of significance. Hence, the calculated‘t’ value is greater than the table ‘t’ value there is significant difference in foot function following conventional therapy among achilles tendinitis in soccer players..

ANALYSIS OF DEPENDENT VARIABLE FOOT FUNCTION IN GROUP B:

The calculated paired‘t’ value is 3.142 and the table‘t’ value is 3.250 at 0.005 level of significance. Hence, the calculated ’t’ value is greater than the table ‘t’ value there is significant difference in foot function following myofascial trigger point manual pressure release with cryotherapy technique among achilles tendinitis in soccer players..

DEPENDENT VARIABLE FOOT FUNCTION BETWEEN GROUP A AND GROUP B:

The calculated unpaired‘t’ value is 36.3and the table‘t’ value is 3.25at 0.005 level of significance. Hence, the calculated ‘t’ value is greater than table ‘t’ value, there is significant difference between conventional therapy and myofascial trigger point manual pressure release technique with cryotherapy in improving foot function among achilles tendinitis in soccer players..

When comparing the mean values of Group A and Group B, Group B subjects treated with myofascial trigger point manual pressure release therapy with cryotherapy showed more difference than Group A. Hence it is concluded that myofascial trigger point manual pressure release therapy with cryotherapy is more effective than ultrasound therapy with stretching in improving foot function among achilles tendinitis in soccer players.

CHAPTER V

DISCUSSION

Achilles tendinitis is one of the conditions, which can be treated by a wide variety of physiotherapy methods. It is still difficult to formulate all proof guidelines for the management of Achilles tendinitis. Various methods of treatment exist with own claims of success without any attempts of comparing the maximal methods. The objective of this study was to find out the effectiveness of myofascial trigger point manual pressure release with cryotherapy in treatment of achilles tendinitis.

The study was conducted on 20 subjects. The subjects were divided into two groups, Group A and Group B.

Group A received ultrasound therapy and stretching.

Group B received myofascial trigger point manual pressure release therapy with cryotherapy.

The aim of the study was to find out effect and compare the effectiveness of ultrasound therapy with stretching and myofascial trigger point manual pressure release therapy with cryotherapy on reduction of pain and improving the foot function among achilles tendinitis subjects.

Results of the present study shows that there is significant difference in pain and foot function following myofascial trigger point manual pressure release therapy with cryotherapy and ultra sound therapy with stretching among achilles tendinitis subjects.

This result was supported Chung et al., (2007) they concluded in their study that treatment of Achilles tendinitis with ultrasound - guided steroid injection. Proximal plantar fascia and heel pad were assessed with a 10 –MHz liner array ultrasound transducer. Pain intensity was quantified with a tenderness threshold (TT) and visual analog scale (VAS) and was concluded that ultrasound offered an objective measurement of therapeutic effect on it.

This results was supported by Speed (1991) concluded that thermal effects of ultrasound increased blood flow, reduced pain , reduced muscle spasm and increased tissue extensibility.

This results was supported Kuhr et al., (2007) performed a randomized control trail study to check out effectiveness in two groups. Group A received therapeutic ultrasound, contrast bath, foot intrinsic muscles strengthening exercise, plantar fascia stretching exercise and Group B received conversional treatment as group A added with myofascial release for 15 minutes for 10 consecutive days and results concluded that myofascial release is an effective therapeutic option in the treatment of achilles tendinitis.

This results was supported John (2007) in a study review of myofascial release as an effective massage therapy technique supports the usage of myofascial release techniques for the treatment of myofascial pain. Myofascial pain can present in clinical setting and can mimic other condition. Literature relies on palpation, symptomatology, and patient's history as keys to the diagnosis of this condition. According to the literature, applying an appropriate myofascial technique can be a very effective therapy for myofascial pain. Results have shown a decrease pain, and an increase in range of motion for the joints acted on by the affected muscle.

Hence the hypothesis first and second are accepted third is rejected.

CHAPTER VI

CONCLUSION

An experimental study was conducted to investigate the effectiveness of ultrasound therapy with stretching and myofascial trigger point manual pressure release therapy with cryotherapy in the management of achilles tendinitis for soccer players.

20 subjects with achilles tendinitis were included in this study and randomly divided into two groups A and B each group consist of 10 subjects. Group A was treated with ultrasound therapy and stretching. Group B was treated with myofascial trigger point manual pressure release therapy and cryotherapy. Pain and foot function were assessed before and after intervention by VAS and FFI.

The statistical result shows that there is improvement in both the groups. But when comparing both its found that myofascial trigger point manual pressure release technique with cryotherapy is more effective than ultrasound therapy and stretching in reducing pain and improving foot function among achilles tendinitis for soccer players.

6.1 LIMITATIONS

1. The study was limited with an age group of 18-23 years.
2. The study was limited to assess only the pain intensity and foot function index
3. This study couldn`t be generalized to everyone, as the sample size was small.

6.2 SUGGESTION

1. As this study was done only with sub acute achilles tendinitis patients, further studies are suggested to detect the progress in patients with other problem of ankle.

2. In this study subjects were tested for pain intensity and foot function index, similar studies could also be done to detect the strength of foot and ankle ability measure.

3. Further studies should have multiple age group, as this study was considered for only 18-23 years.

4. As the study was done for a short period, a long –term study also can be done.

5. Further studies can be done with functional outcome measures as a parameters.

6. Further studies can be done with newer method of electrotherapy modalities.

CHAPTER VII

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2. www.medline.com
3. www.studentsttest.com
4. www.grapgpad.com

CHAPTER VIII

ANNEXURES

ANNEXURE -I

ASSESSMENT CHART

(I) Subjective Examination:-

a) Name :

b) Age :

c) Sex : □ □

d) Occupation :

e) Chief complaints :

Dislocation of Ankle Joint	Yes /No
Hyper mobility	Yes/ No
Recent fracture around the feet	Yes/ No
Neurological disorders	Yes/ No
Hypo mobility	Yes/ No

f) Weight : kgs

g) Height : cms

(II) **History collection:-**

a) Present Medical history

Any fracture or dislocation of Ankle or foot - Yes/No

b) Past Medical history:-

Fracture complication of the Ankle and foot -Yes/No

(III) OBJECTIVE EXAMINATION:

a) On Observation:

- General body built
- Musculature
- Deformity
- Tropic changes
- External appliances

b) On Palpation:

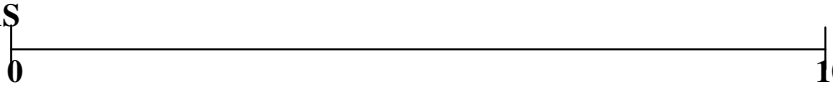
- Temperature
- Swelling
- Bony prominence
- Local tenderness
- Oedema or effusion
- Nodules
- Scar tissue
- Muscle spasm

c) On Examination:

PAIN ASSESSMENT (USING VAS)

- On set -
- Duration -
- Site of pain -
- Type of pain -
- Nature of pain -
- Aggravating factors -
- Relieving factors -

USING VAS



0 **10**

No Pain Maximum

SENSORY EXAMINATION:

- Temperature
- Pressure

MOTOR EXAMINATION:

Muscle power assessment - Calf Muscles, Intrinsic Muscles

Joint range of motion - Ankle dorsiflexion

- Ist MTP Joint extension

(iv) DIAGNOSIS:

- X – Ray
- Medical Imaging
- Special Tests

(a) Point tenderness □ + ve □ - ve

(b) Self stretch Test □ + ve □ - ve

(c) Haglund syndrome □ + ve □ - ve

(v) AIMS :

(vi) Means :

(vii) Home Program :

ANNEXURE –II

FOOT AND ANKLE ABILITY MEASURE (FAAM) ACTIVITY OF DAILY LIVING

S.No	ACTIVITY	NO DIFFICULTY	MODERATE DIFFICULTY	EXTREME DIFFICULTY	UNABLE TO DO	N/A
1.	Standing					
2.	Walking on even Ground					
3.	Walking on even ground without shoes					
4.	Walking up hills					
5.	Walking down hills					
6.	Going down stairs					
7.	Walking on uneven ground					
8.	Steeping up and down curbs					
9.	Stepping up and down curbs					
10.	Squatting					
11.	Coming up on your toes					
12.	Walking initially					

13.	**Walking 5 minutes or less**					
14.	**Walking approximately 10 minutes**					
15.	**Walking 15 minutes or greater**					
16.	**Home responsibility**					
17.	**Activities of daily living**					
18.	**Personal care**					
19.	**Light to moderate work (standing, walking)**					
20.	**Heavy work (push/pulling, climbing, carrying)**					
21.	**Recreational activities**					

ANNEXURE-III

FOOT FUNCTION INDEX

SECTION 1:

TO BE COMPLETED BY PATIENT

Name:_____ Age: ____Date:_____

Occupation: _____Number of days of foot

Pain:_____(this episode)

SECTION 2:

TO BE COMPLETED BY PATIENT

This questionnaire has been designed to give your therapist information as to how your foot pain has affected your ability to manage in everyday life. For the following questions, we would like you to score each question on a scale from 0(no pain)to 10(worst pain imaginable)that best describes your foot over the past week. Please read each question and place a number from 0-10 in the corresponding box.

No Pain 0 1 2 3 4 5 6 7 8 9 10 Worst pain imaginable

1. In the morning upon taking your first step?
2. When walking?
3. When standing?
4. How is your pain at the end of the day?
5. How severe is your pain at its worst?

Answer all of the following questions related to your pain and activities over the past week, how much difficulty did you have?

DISABILITY SCALE

No Difficulty 0 1 2 3 4 5 6 7 8 9 10 Too Difficult unable to do

6. When walking in the house?
7. When walking outside?
8. When walking four blocks?
9. When climbing stairs?
10. When descending stairs?
11. When standing tip toe?
12. When getting up from a chair?
13. When climbing curbs?
14. When running or fast walking?

Answer all the following questions related to your pain and activities over the past week. How much of the time did you have?

DISABILITY SCALE

None of the time 0 1 2 3 4 5 6 7 8 9 10 All of the time

15. Use an assistive device (cane, walker, crutches, etc) indoors?
16. Use an assistive device (cane, walker, crutches, etc) outdoors?
17. Limit physical activities?

SECTION 3:

TO BE COMPLETED BY PHYSICAL THERAPIST

SCORE: _____/170×100=_____ %(SEM 5, MDC 7)

SCORE: Initial _____Subsequent_____ Subsequent _____Discharge_____

Number of treatment sessions: _____

Diagnosis/ICD-9 Code: _____

ANNEXURE IV

RAW DATAS OF PAIN AND FOOT FUNCTION

TABLE: 7

PRE AND POST-TEST VALUES OF PAIN IN GROUP A

SL.NO	PRE TEST	POST TEST
1	9	5
2	6	3
3	9	4
4	8	4
5	6	3
6	6	4
7	7	4
8	8	5
9	8	4
10	7	4

TABLE: 8

PRE AND POST-TEST VALUES OF PAIN IN GROUP B

SL.NO	PRE TEST	POST TEST
1	8	2
2	9	3
3	9	2
4	8	2
5	7	1
6	8	2
7	9	3
8	7	2
9	7	1
10	8	2

TABLE: 9

PRE AND POST-TEST VALUES OF FOOT FUNCTION INDEX IN GROUP A

SL.NO	PRE TEST	POST TEST
1	78.25	38.54
2	61.35	33.25
3	76.25	37.55
4	71.54	35.24
5	60.14	32.87
6	63.21	35.24
7	65.58	37.41
8	72.36	35.21
9	70.45	33.21
10	63.24	32.33

TABLE: 10

PRE AND POST-TEST VALUES OF FOOT FUNCTION INDEX GROUP B

SL.NO	PRE TEST	POST TEST
1	72.12	18.32
2	75.24	20.25
3	77.1	19.56
4	70.95	16.32
5	65.24	15.24
6	74.17	18.41
7	80.25	19.35
8	61.43	16.52
9	60.52	16.2
10	73.75	16.95

ANNEXURE V

PATIENT CONSENT FORM

I……Voluntarily consent to participate in the research named on **"A COMPARATIVE STUDY ON EFFECTIVENESS OF ULTRASOUND THERAPY WITH STRETCHING AND MYOFASCIAL TRIGGER POINT MANUAL PRESSURE RELEASE WITH CRYOTHERAPY IN REDUCING PAIN AND IMPROVING FOOT FUNCTION AMONG ACHILLES TENDINITIS PATIENTS".**

The researcher has explained me the treatment approach in brief, risk of participation and has answered the questions related to the study to my satisfaction.

Signature of Patient **Signature of researcher**

Signature of witness

Place :

Date :